QUALITATIVE ANALYSIS

Analysis of the given simple salt (_____)

	EXPERIMENT	OBSERVATION	INFERENCE
	Preliminary Test		
1	Colour and appearance 1. Colour of the salt is noted	1. Blue 2. Green 3. Brown 4. Colourless	1. May be Copper Salt. 2. May be Copper or Ferrous salt 3. May be Ferric salt 4. Absence of Cu and Fe salts
	2. Appearance of the salt is noted	1. Crystalline 2. Powdery	1. Maybe sulphate, chloride, bromide or nitrate salt. 2. Maybe carbonate or sulphide salts.
2	Solubility: A little of the salt is shaken well with distilled water.	1. Soluble 2. Insoluble	1. Maybe sulphate, chloride, bromide or nitrate salt. 2. Maybe carbonate or sulphide salt.
3	Action of heat: A small amount of the salt is taken in a dry test tube and heated. Gently at first and then strongly if required.	1. Colourless odourless gas evolves turning lime water milky 2. Decrepitation occurs, Reddish Brown gas evolves turning starch iodide paper blue. 3. Salt sublimes; pungent smelling gas evolves giving dense white fumes with a glass rod dipped in concentrated HCL. 4. The colour of the salt changes from blue to white. 5. The salt becomes yellow when hot and white when cold. 6. No characteristic change	1. Maybe Carbonate salt 2. Maybe Nitrate salt 3. Maybe Ammonium salt 4. Maybe Copper salt 5. Maybe Zinc salt 6. Absence of carbonate, nitrate, zinc, ammonium and copper salts
4	Flame Test: A small amount of salt is made into paste with concentrated HCl in a watch glass and introduced into the non-luminous part of the Bunsen burner flame	1. Bluish-green flame 2. Grassy-green flame 3. Brick-red flame 4. No characteristic coloured flame	Presence of Copper Presence of Barium Presence of Calcium Absence of Copper, Barium, Calcium
5	Ash Test: A filter paper is soaked in a mixture of salt, concentrated nitric acid and cobalt nitrate solution and introduced into ignited Bunsen flame.	1. Blue coloured Ash 2. Green coloured ash 3. Brick-red flame 4. No characteristic coloured flame	1. Presence of Aluminium 2. Presence of Zinc 3. Presence of Magnesium 4. Absence of Aluminium, Zinc, Magnesium.
	Identification of Acid Radical (Anion)		
1	Action of dilute hydrochloric acid: To a small amount of salt	1. Colourless odourless gas evolves with brisk effervescence turning	1. Presence of carbonate confirmed

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	Dilute Hydrochloric is added	limewater milky 2. Colourless rotten egg smelling gas turning lead acetate paper black 3. No characteristic change.	2. Presence of sulphide confirmed 3. Absence of carbonate and sulphide
2	Action of acidified potassium permanganate: To a small amount of salt solution a few drops of potassium permanganate acidified with dilute sulphuric acid is added with shaking	1. Pink colour of potassium permanganate decolourises 2. No characteristic change	1. Presence of sulphide 2. Absence of sulphide
3	Action of concentrated sulphuric acid: To a small amount of salt 2-3 drops of concentrated sulphuric acid is added and heated	1. Colourless gas evolves giving dense white fumes with a glass rod dipped in ammonium hydroxide and turns moist blue litmus red 2. Reddish brown gas evolves turning ferrous sulphate paper brown 3. Reddish orange gas evolves 4. No characteristic change.	1. Presence of Chloride 2. Presence of Nitrate 3. Presence of Bromide 4. Absence of Chloride, Nitrate and Bromide
4	Manganese dioxide test: A small amount of salt is heated with a piece of manganese dioxide and few drops of concentrated sulphuric acid	1. Greenish yellow gas evolves with irritating smell turning starch iodide paper blue. 2. Brown-red vapours evolve turning starch iodide paper blue. 3. Violet vapours evolve. 4. No characteristic change.	1. Presence of Chloride 2. Presence of Bromide 3. Presence of Iodide 4. Absence of Chloride, Bromide and Iodide
5	Copper Turning Test: A small amount of salt is heated with copper turnings and concentrated sulphuric acid.	1. Reddish brown fumes evolve and the solution in the test tube appears blue. 2. No evolution of reddish brown fumes.	1. Presence of Nitrate. 2. Absence of Nitrate.
6	Action of Sodium Hydroxide: A small amount of salt is heated with sodium hydroxide solution	1. Pungent smelling gas evolves giving dense white fumes with a glass rod dipped in concentrated hydrochloric acid, also turns moist red litmus blue. 2. No pungent smelling gas evolves.	1. Presence of Ammonium salt. 2. Absence of Ammonium salt
7	Chromyl Chloride test: To a small amount of salt, a pinch of potassium dichromate is added and heated with a few drops of Concentrated sulphuric acid	1. Red-orange vapours evolve which on passing through water in a test tube, yield a yellow coloured solution. On adding lead acetate solution	1. Presence of Chloride

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	Preparation of Sodium Carbonate Extract: Prepare sodium carbonate extract by boiling a mixture of salt and anhydrous sodium carbonate with water for 15 minutes in a conical flask. Place a funnel in the mouth of the flask to minimise loss of water by evaporation. Cool and filter. The filtrate is called sodium carbonate extract or soda extract.		
8	Silver Nitrate test: To a few drops of the extract, dilute nitric acid is added until the effervescence ceases and 2mL of Silver Nitrate solution is added.	1. A curdy white precipitate completely soluble in excess Ammonium Hydroxide is obtained. 2. A pale-yellow precipitate is obtained 3. A Black precipitate is obtained 4. No characteristic change.	1. Presence of Chloride 2. Presence of Bromide 3. Presence of Sulphide 4. Absence of Chloride, Bromide and Sulphide.
9	Lead acetate test: To a few drops of the extract, dilute nitric acid is added until the effervescence ceases and 2mL of Silver Nitrate solution is added.	1. A white precipitate completely soluble in ammonium acetate and sodium hydroxide mixture is obtained 2. A black precipitate soluble in hot dilute nitric acid is obtained 3. No characteristic change	1. Presence of sulphate is confirmed 2. Presence of sulphide 3. Absence of sulphate and sulphide
10	Barium Chloride test: To a few drops of the extract, dilute hydrochloric acid is added, until the effervescence ceases and 2mL of Barium Chloride is added.	1. A white precipitate insoluble in concentrated hydrochloric acid is obtained 2. No white precipitate obtained.	1. Presence of sulphate is confirmed 2. Absence of sulphate
11	Brown Ring test: To a few drops of the extract, dilute sulphuric acid is added until the effervescence ceases. The solution is treated with freshly prepared ferrous sulphate and the concentrated sulphuric acid is added in drops along the slides of the tube.	1. Brown ring is formed at the junction of both the layers. 2. No characteristic change	1. Presence of Nitrate confirmed. 2. Absence of Nitrate.
12	Sodium nitro prusside test: To a few drops of the extract, a little amount of sodium nitro prusside solution is added.	1. Violet or pink coloured precipitate is obtained 2. No characteristic change	1. Presence of sulphide 2. Absence of sulphide
	The given acid radical is _____.		

	EXPERIMENT	OBSERVATION	INFERENCE
	Identification of Basic Radical (Cation)		
	Group Separation		
	Preparation of Original Solution: The original solution is prepared by dissolving few grams of the salt in 10-15 mL of distilled water. If it is insoluble it is prepared by dissolving it in dilute or concentrated hydrochloric acid.		
1	To a few drops of the original solution, dilute hydrochloric acid is added.	1. White precipitate, soluble in water on boiling, is obtained. 2. No characteristic change.	1. Presence of Lead (I Group) 2. Absence of Lead.
2	To a few drops of the original solution, dilute hydrochloric acid is added, and Hydrogen Sulphide gas is passed.	1. A Black precipitate is obtained. 2. No characteristic change.	1. Presence of Copper (II Group) 2. Absence of Copper
3	To a few drops of the original solution, 1mL of Ammonium Chloride and 2mL of Ammonium Hydroxide solutions are added.	1. Gelatinous white precipitate soluble in sodium hydroxide solution is obtained. 2. Brown precipitate soluble in dilute hydrochloric acid is obtained. 3. No characteristic change.	1. Presence of Aluminium (III Group) 2. Presence of Ferric (III Group) 3. Absence of aluminium and ferric
4	To a few drops of the original solution, 1mL of Ammonium Chloride and 2mL of Ammonium Hydroxide are added, Then H_2S gas is passed.	1. Dirty white precipitate is obtained. 2. No characteristic change.	1. Presence of Zinc (IV Group) 2. Absence of Zinc.
5	To a few drops of the original solution, 1mL of Ammonium Chloride, 2mL of Ammonium Hydroxide and 2mL of saturated Ammonium Carbonate solutions are added.	1. A white precipitate is obtained. 2. No characteristic change.	1. Presence of Barium or Calcium (V Group) 2. Absence of Calcium and Barium.
6	To a few drops of the original solution, 1mL of Ammonium Chloride, 2mL of Ammonium Hydroxide and 2mL of Di-Sodium Hydrogen Phosphate solutions are added.	1. White precipitate is obtained. 2. No characteristic change.	1. Presence of Magnesium (VI Group) 2. Absence of Magnesium
7	A small amount of salt is heated with sodium hydroxide solution.	Pungent smelling gas evolves giving dense white fumes with a glass rod dipped in concentrated hydrochloric acid which turns moist red litmus blue.	Presence of Ammonium (Zero Group)

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	Lead (I Group) 1. To a few drops of the original solution, Potassium Chromate solution is added in drops.	Yellow precipitate is obtained.	Lead is confirmed.
	2. To a few drops of the original solution, 2mL of Potassium iodide solution is added.	Yellow precipitate soluble in hot water is obtained which reappears as “Golden Yellow Spangles” on cooling.	Lead is confirmed.
	Copper (II Group) 1. To a few drops of original solution, Ammonium Hydroxide solution is added in drops.	Pale blue precipitate that dissolves in excess Ammonium hydroxide to form deep blue solution is obtained.	Copper is confirmed.
	2. To a few drops of the original solution, 2mL of Potassium Ferro Cyanide solution is added.	Chocolate brown precipitate is obtained.	Copper is confirmed.
	Aluminium (III Group) 1. To a few drops of the original solution, Sodium Hydroxide solution is added in drops in excess	A white precipitate soluble in excess sodium hydroxide is obtained.	Aluminium is confirmed.
	2. To a few drops of the original solution, 2mL of Ammonium Hydroxide and a few drops of Aluminion Reagent is added.	A bright red solution is obtained	Aluminium is confirmed.
	Ferric (III Group) 1. To 1mL of original solution 2mL of Potassium Ferro Cyanide solution is added.	Blue colouration is obtained.	Ferric is confirmed.
	2. To a few drops of the original solution, 2mL of Ammonium Thiocyanate solution is added.	Blood red colouration is obtained.	Ferric is confirmed.
	Zinc (IV Group) 1. To 1mL of original solution, Sodium Hydroxide is added in drops in excess	White Precipitate soluble in excess sodium Hydroxide is obtained.	Zinc is confirmed.
	2. To 1mL of original solution, 2mL of Potassium Ferro Cyanide is added.	White Precipitate soluble in excess sodium Hydroxide but insoluble in dilute acids is obtained.	Zinc is confirmed.

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	Barium (V Group) 1. To a few drops of the original solution, Potassium chromate solution is added.	Yellow precipitate is obtained.	Barium is confirmed.
	2. To 1mL of original solution, dilute sulphuric acid is added.	A white precipitate soluble in acetic acid is obtained.	Barium is confirmed.
	Calcium (V Group) 1. To a few drops of the original solution, Potassium chromate solution is added.	No precipitate is obtained	Calcium is confirmed.
	2. To a few drops of original solution, 1mL of Ammonium Hydroxide and 2mL of Ammonium Oxalate solutions are added.	A white precipitate soluble in acetic acid is obtained.	Calcium is confirmed.
	Magnesium (VI Group) 1. To a few drops of original solution, Sodium Hydroxide solution is added in drops in excess.	A white precipitate soluble in excess sodium Hydroxide is obtained.	Magnesium is confirmed.
	2. To a few drops of the original solution, 2-3 drops of Magnesium Reagent is added followed by drops of Sodium Hydroxide.	Blue precipitate is obtained	Magnesium is confirmed.
	Ammonium (Zero Group) To 1mL original solution, few drops of Nessler's Reagent and excess of Sodium Hydroxide solutions are added.	Reddish Brown precipitate is formed.	Ammonium is confirmed.
	The given Basic Radical is _____.		
	Report: The given acid radical is _____. The given basic radical is _____. Therefore, The give simple salt is _____.		